insertion area **112**. Thus, as indicated by a dotted line of FIG. **16**, when the surgical instruments **1000**A-**1** and **1000**A-**2** approach each other, the head portions **1002**A of the surgical instruments **1000**A-**1** and **1000**A-**2** may interference with each other. Thus, there is a range in which the surgical instruments **1000**A-**1** and **1000**A-**2** may not move together to avoid interference with each other, and thus, the workspaces of the surgical instruments **1000**A-**1** and **1000**A-**2** are reduced.

As described above, according to the support equipment **100** of the present embodiment, by using the surgical instrument **1000** having the bent extension portion **1001**, the workspace of the surgical instrument **1000** may be efficiently used and also a large workspace for a surgical operation may be obtained under given conditions.

Although, in the above-described embodiment, a support equipment **100** with two instruments is described, the present inventive concept is not limited thereto. A support equipment in which three or more instruments are installed and each instrument is characterized by an RCM may be embodied.

It should be understood that the exemplary embodiments described therein should be considered in a descriptive sense only and not for purposes of limitation. Descriptions of features or aspects within each embodiment should typically be considered as available for other similar features or aspects in other embodiments. For example, one of ordinary skill in the art may understand that the support equipment, the instrument, and the surgical robot system according to the present inventive concept may be variously modified. Also, the support equipment and the surgical instrument according to the present inventive concept may be applied not only to surgical equipment or system but also to other equipment.

What is claimed is:

1. A surgical instrument comprising:

an extension portion having a surgical tool at an end thereof;

a head portion connected to the extension portion, the head portion configured to generate a reciprocating force; and

a plurality of rods linearly connected from the head portion to the extension portion, the plurality of rods including at least a rigid main rod and a rigid actuation rod connected via a flexible rod such that the rigid main rod is configured to transfer the reciprocating force from the rigid main rod to the rigid actuation rod via the flexible rod, wherein the extension portion includes,

a first extension portion connected to the head portion and having at least a portion of the rigid main rod passing therethrough,

a second extension portion having an elbow joint portion that is bending-actuated by the rigid actuation rod that is reciprocated in a lengthwise direction by the head portion, and

a connection portion connecting the first extension portion and the second extension portion, the connection portion having the flexible rod passing therethrough from the rigid main rod to the rigid actuation rod at an angle, the connection portion having a plurality of guides therein such that the plurality of guides are configured to come into rolling contact with the flexible rod when the flexible rod passes therethrough.

2. The surgical instrument of claim **1**; wherein

the rigid main rod is extending from the head portion toward the first extension portion and is reciprocated in a lengthwise direction by a motor, and

the flexible rod is in the connection portion, the flexible rod having one end portion and another end portion each respectively connected to the rigid actuation rod and the rigid main rod, the flexible rod being reciprocated by the rigid main rod, performing a rigid motion in a lengthwise direction, and being capable of bending.

3. The surgical instrument of claim **2**, wherein the plurality of guides includes a first guide at least one of an inner portion and an outer portion of the flexible rod in a bending direction to guide the flexible rod.

4. The surgical instrument of claim **3**, wherein the first guide is a roller-type guide and is supported on the connection portion to be capable of rotating in rolling contact with the flexible rod.

5. The surgical instrument of claim **3**, wherein the surgical tool is actuated by a wire actuation method, and the first guide divides an inner space of the connection portion into a space where a wire for actuating the surgical tool is arranged and a space where the flexible rod is arranged.

6. The surgical instrument of claim **3**, wherein the plurality of guides includes a second guide connected to at least two opposite points of the connection portion along a circumference of the connection portion such that the at least two opposite points are in a direction perpendicular to a bending direction of the flexible rod to guide the flexible rod.

7. The surgical instrument of claim **1**, wherein the elbow joint portion is rolling actuated.

8. The surgical instrument of claim **1**, wherein the elbow joint portion comprises:

a first arm connected to the connection portion,

a second arm connected to the first arm via a pitching shaft, the second arm configured to pivot around the pitching shaft, the second arm being bending actuated with respect to the first arm, and

a joint link having one end portion connected to the second arm at a position spaced apart from the pitching shaft of the first arm and another end portion of the joint link is connected to the rigid actuation rod.

9. A support equipment comprising:

at least one surgical instrument including,

an extension portion having a surgical tool at an end thereof,

a head portion connected to the extension portion, the head portion configured to generate a reciprocating force, and

a plurality of rods linearly connected from the head portion to the extension portion, the plurality of rods including at least a rigid main rod and a rigid actuation rod connected via a flexible rod such that the rigid main rod is configured to transfer the reciprocating force from the rigid main rod to the rigid actuation rod via the flexible rod;

a base member having an insertion area; and

at least one movable member supporting the surgical instrument and installed on the base member to be capable of moving around the insertion area, wherein the extension portion includes,

a first extension portion connected to the head portion and having at least a portion of the rigid main rod passing therethrough,

a second extension portion having an elbow joint portion that is bending-actuated by the rigid actuation rod that is reciprocated in a lengthwise direction by the head portion, and

a connection portion connecting the first extension portion and the second extension portion, the connection portion having the flexible rod passing therethrough from the rigid main rod to the rigid actuation rod at an angle, the connection portion having a plurality of guides therein such that the plurality of guides are